STATE OF NORTH CAROLINA
DEPARTMENT OF ADMINISTRATION
PURCHASE AND CONTRACT DIVISION

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SPECIFICATION FOR CRANE, CRAWLER MOUNTED (50 TON CLASS)

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers a heavy duty, diesel powered lift crane of the full revolving, crawler mounted type. It does not include all types and sizes of lift cranes, but only the size generally used by the North Carolina Department of Transportation, Division of Highways.

I. CLASSIFICATION

The crane shall be of the size specified in Table I, page 2.

II. APPLICABLE STANDARDS

The following documents of issue in effect on the date of the Invitation for Bids shall form a part of this specification to the extent specified:

SAE J987 - Boom - Method of Test
SAE J765 - Crane Load Stability Test Code
SAE J1349 - Engine Test Code
J820 - Crane Hoist Line Speed and Power Test Code
J881 - Sheave and Drum Sizes
SAE J1166 - Sound Measurement - Earth Moving Machinery - Operator Work Cycle
J999 - Crane Boom Hoist Disengaging Device
SAE J1083 - Unauthorized Starting or Movement of Machines
SAE J930 - Storage Batteries for Off-Road Work Machines

Society of Automotive Engineers, Inc. (SAE)
400 Commonwealth Drive
Warrendale, PA 15096

Federal Occupational Safety and Health Act Standards
U.S. Department of Labor
200 Constitutional Avenue, NW
Washington, DC 20210

State Occupational Safety and Health Act Standards
N.C. Department of Labor
OSHA Division
4 West Edenton Street
Raleigh, N. C. 27611

PCSA-4 Standard
Power Crane and Shovel Assn. (PCSA)
111 E. Wisconsin Avenue
Milwaukee, WI 53202

TABLE I

CRANE MINIMUM REQUIREMENTS

1 - Operating Weight **	85,000
2 - Lift Capacity at 30' Radius with 40' boom at 75% tipping load (lbs.)*	17,500
3 - Net Brake Horsepower (at flywheel, per SAE J1349)	120
4 - Operating Speeds	
Crawl Speed (MPH)	0.75
Swing Speed (RPM)	3.5
5 - Gradeability (%)	25
6 - Line Speeds	
Fly-Jib Speed (FPM)	150
Hoist Speed (FPM)	150
7 - Overall Crawler Length (Ft./In.)	14-6
8 - Track Pad Width - Nominal (In.)	36
9 - Boom Length (Ft./In.)	40-0

* See Lifting Capacity (Section III.A.6.)
** See Excavator Operating Weight (Section III.A.5.)

III. REQUIREMENT

A. GENERAL

This specification covers diesel, self-propelled, full revolving crawler mounted lift cranes. The crane shall be complete with all accessories and equipment normally furnished by the manufacturer and customarily used in lift crane operations such as pile extraction and pile driving operations, whether stipulated herein or not. The machine shall include such modifications and attachments as may be necessary to enable the unit to function reliably and efficiently in sustained operation.

1. Standard Products

The crane shall be essentially the standard product of the manufacturer differing therefrom only in respects necessary to meet the requirements of lift crane operation. The component parts of the unit need not be of the same manufacturer. The crane offered shall be a current production model.

2. Use Conditions

Design and construction shall be such that crane will withstand the extremely hard usage encountered in service, such as pile extraction and pile driving operations, and operation in the open air under all weather conditions for extended periods of time. Components shall be designed to resist the harmful effects of dust or water (salt or fresh).

3. Ease of Maintenance

The design of the machine shall permit ready accessibility for service, replacement, and adjustment of component parts and accessories with minimum disturbance to the other elements.

4. Frame

The frame shall be designed to withstand maximum stresses under normal operating conditions and in addition, provide adequate support for attaching any device approved by the crane manufacturer for use in combination with the crane.

5. Crane Operating Weight

The crane operating weight shall include all standard equipment, 36" (nominal) pads, 40' boom, fully serviced, including 175 pound operator and full fuel tank. The total counterweight shall not exceed 30.0% of the operating weight as described above.

6. Lifting Capacity

Based on the crane at the above stated Operating Weight, lift capacities are to be valid for 360 degree rotation and not to exceed 75% of tipping load. (NOTE: lift capacity is the maximum allowable load that can be lifted including the weight of the auxiliary load handling equipment). Lift capacities shall be specified in Table I.

7. Occupational Safety and Health Act

The crane shall be furnished with all applicable equipment and accessories as required by the Occupational Safety and Health Act (U.S. Department of Labor and the N.C. Department of Labor), including the following:

29 CFR 1926.52 - Occupational Noise Exposure

The crane shall be constructed and assembled so that the noise at ear level of the seated operator, with all doors, windows and vents open; when measured in accordance with SAE-J1166 - Work Cycle Test, shall not exceed the permissible noise exposure limits of this regulation for 8-hour operator exposure.

29 CFR 1926.600 - Equipment

Safety glass for enclosed cab.

B. ENGINE

1. Diesel Engine

The engine shall be compression ignition type, 2 or 4-cycle, minimum 4 cylinders and capable of operating on commercial diesel fuel as recommended by the manufacturer. The engine shall be equipped with an adequate and efficient fuel injection mechanism, heavy duty fuel oil filter system and heavy duty full flow type lubricating oil filter. The

air cleaner shall either be two-stage (precleaner and dry type elements), or dual element type (primary and secondary dry type elements). Air cleaner hose shall be of metal or heavy duty flexible, non-collapsible type, (wire reinforced hose not acceptable) and with metal or molded rubber elbows. All air cleaner connections must be banded. Exhaust pipe shall be of the deflector type. The minimum net brake horsepower at the engine flywheel shall be as shown in Table I.

2. Engine Governor

The engine governor shall be of the mechanical or hydraulic type and shall be driven from the engine. Provisions shall be made for permitting regulation of the governed speed-setting throughout the engine load range while the engine is in operation.

3. Engine Starting System

The manufacturer's standard electric starting system with heavy duty battery (SAE J930) shall be acceptable for cranking the engine. The engine starting system shall be capable of cranking the engine in an ambient temperature of-20°F. The battery shall be specifically designed to withstand the shock, vibration, and dusty environment normally encountered by off-road work machines. A shock resistant battery mount is not an acceptable substitute for the type of battery required, though such amount may be furnished in addition to the proper battery. A means shall be provided to lock the starting controls and a concealed electrical disconnect shall be provided (SAE J1082).

4. Engine Cooling System

The unit shall have heavy duty radiator and blade type fan. The cooling system shall be protected to a minimum of -20°F and so tagged.

5. Engine Lubricating System

The manufacturer's current standard production lubricating system shall be acceptable, provided all anti-friction bearings are protected by suitable seals to prevent the entrance of abrasive matter. Lubrication fittings shall be grouped and located for maximum accessibility.

C. FUEL TANK

The machine shall have a large enough fuel tank to allow continuous operation for eight hours. The fuel tank shall be located so as not to be affected by heat from the engine or exhaust system. The machine must be capable of being fueled by service truck with regular fueling nozzle. It is not to be equipped with a hand operated or other type fuel transfer pump.

D. POWER TRAIN AND POWER TAKE-OFF

1. Gears

All main machinery gears in the power train shall be enclosed in dirt tight cases and shall run in a bath of

oil. All other gears in the upper structure shall also be enclosed, and if not run in oil bath, they shall have conveniently located means for frequent lubrication. All power transmitting parts used on the revolving frame that are used in the lifting cycle must be mounted on anti-friction bearings.

2. Power Take-off

Power take-off from the engine may be mechanical drive, hydrodynamic drive (fluid coupling or torque converter), or hydrostatic drive. The power take-off shall include a friction disconnect clutch, controlled from the operator's station. In revolving superstructure machinery drives, the disconnect clutch shall be provided with a device requiring positive manual effort to engage. Where a transmission having neutral position is used in combination with an engine clutch, the clutch may be of the spring loaded type.

E. CRAWLER BASE

The minimum overall crawler length shall be as specified in Table I. Drive tumblers and idlers shall be of the self-cleaning type and have means for adjustment. Crawler pads shall be flat with smooth tapered surfaces to deflect dirt, prevent gouging on short turns, and minimize damage to road surfaces. The pads shall be 36" wide (nominal). Operating speeds shall be as specified in Table I. Machine without load shall be capable of climbing a 25% grade on smooth, dry surface, providing the required traction.

F. BOOM

1. Boom

The boom shall be angle type and the boom length shall be as specified in Table I, measured from center to center of end pins. Boom shall be fully warranted and amply designed for service with the specified crane size. The boom shall have a pendant type suspension, and provisions shall be incorporated for readily increasing the boom length by inserting additional sections.

2. Boom Tip

The boom tip shall be provided with three sheaves of equal size mounted on bushings. Full rope guards shall be provided for sheaves and boom tip.

3. Boom Controls

The crane shall have an independent, positive boom control at all times and for all operations. The crane shall have independent power up and power down boom hoist which shall be operable while the machine is hoisting, swinging, or crawling.

The boom hoist shall be capable of suspending the boom and rated load with manufacturer's recommended reeving, without attention from the operator, and allow lowering only when under operator's control.

4. Boom Hoist Limiting Device

The machine shall have a boom stop to effectively prevent the boom from raising above a safe angle.

5. Gantry

The crane shall be equipped with the manufacturer's standard gantry.

G. MAIN, AUXILIARY, AND THIRD DRUMS

1. Drum Clutches

Drum clutches when properly maintained and adjusted, shall be capable of developing 110% of the published line pull.

2. Drum Brakes

Drum brakes when properly maintained and adjusted shall be capable of holding 110% of the published line pull. The brakes shall be capable of maintaining the load in suspended position, in normal operating cycles.

3. Third Drum

The crane shall be equipped with an independently operated third drum. This drum shall operate independently of controlled load lowering and shall be dedicated to pile extracting, pile driving and other Auxiliary uses. The drum is to be installed by the manufacturer and ready for use when the machine is delivered.

4. Lagging

Removable, grooved lagging shall be provided on the main and auxiliary load hoist drums.

H. CAB AND MACHINERY HOUSING

The operator's cab and machinery housing shall be a fully enclosed steel structure. Doors shall be provided on the sides and rear for convenient entrance and exit to the operator's position and machinery.

The operator's cab shall have safety glass panels for full vision of the crane working area. The door to the operator's cab shall have a key locking door handle and door hold back. The operator's seat shall be located within easy and convenient reach of the crane operating hand controls and foot pedals.

A catwalk and an overhead grab rail shall be furnished on each side of the cab and machinery housing.

I. ATTACHMENTS

The crane shall be furnished with the following:

1. Fairlead

The crane shall be equipped with a full revolving fairlead with anti-friction bearings on revolving frame. Wear plates or rollers shall be furnished at cable entrance.

2. Tagline

A coil type tagline shall be furnished complete with the crane manufacturers recommended cable and accessories, Rud-O-Matic 636, or equivalent.

3. Hook Block

Furnish one (1) hook block to handle the maximum rated lift capacity of the crane offered.

J. AUXILIARY ATTACHMENTS

The machine shall be constructed so that a live PTO powered independent drill attachment can be added; Auger size approximately 30" diameter.

K. EQUIPMENT AND ACCESSORIES

Crane shall be furnished with the following equipment and accessories:

1. Muffler.
2. Air cleaner restriction indicator of the proper size and setting, Bacharach or equal.
3. Radiator guard.
4. Slow moving vehicle emblem.
5. Boom angle indicator.
6. Inside cab mounted fire extinguisher.
7. Cold weather starting aid (pressure canister, cable controlled from operator's station).
8. Vandalism protection kit. The kit shall include locking type doors and lock type caps for exposed filler caps and oil dipstick pipe (less padlocks).
9. Swing lock and swing brake.
10. An overload warning device.
11. A side load warning device and safety "kick- out".

L. STEERING AND BRAKING

The machine shall be capable of being steered either right or left in either direction of travel. Control shall be from the operator's position on revolving superstructure.

Traction jaw clutches and spring loaded traction brakes must be designed to prevent "runaways" in rough terrain.

M. TOOLS AND LUBRICATING EQUIPMENT

A tool box with lock shall be provided on the machine and shall contain all special tools necessary for servicing the machine. A suitable hand operated lever type grease gun shall be provided.

N. PAINTING

All exposed metal parts of the machine shall be cleaned of all mill scale, rust, grease, etc., then primed and undercoated with a rust resistant paint in accordance with the acceptable shop practice. The finish coat shall be Department of Transportation, Division of Highways, Yellow, Moline MPM-#11-Y169A leadfree, or its acceptable equivalent. Interior of the cab shall be a non-glare color.

O. OPERATOR'S SEAT AND CONTROLS

The operator's seat shall be located within easy and convenient reach of all controls. It shall provide for comfortable riding position and for good visibility of the work zone and hoist position. The machine shall be either manually controlled, manually controlled with mechanical boosters, or hydraulic or air assist.

P. INSTRUMENTS AND GAUGES

The instrument panel shall be located in view of the seated operator. The manufacturer's standard instrumentation shall be furnished unless otherwise specified in the IFB.

IV. WARRANTY

The contractor warrants to the owner that all equipment furnished under this specification will be new, of good material and workmanship, and agrees to replace promptly any part or parts which by reason of defective material or workmanship shall fail under normal use, free of negligence or accident, for a minimum period of 12 months from date put in operation. Such replacement shall include all parts, labor and transportation costs to the location where equipment is down, free of any charge to the owner or his representative.

Under same and all conditions as above, the power train (engine, transmission, torque converter, and final drive) shall be covered for an additional period of at least 24 months. Any periodic inspections which may be performed by the contractor or his representative shall be without charge to the owner.

V. SERVICE, PARTS, AND OPERATOR'S MANUALS

The contractor shall furnish a qualified representative to instruct the owner's operator(s) in the operation and maintenance of the equipment for a minimum period of eight hours.

An operator's manual, shop manual and complete parts book shall be furnished. The quantity to be specified in the Invitation for Bids.

VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE

Upon receipt of each crane at the receiving point, the purchaser or his authorized representative shall arrange for an acceptance inspection for compliance with the provisions of this specification.

The contractor shall furnish a pilot model for examination, test and possible modification and/or adjustment of attachments in accordance with this specification.

VII. DELIVERY AND PAYMENT

Delivery of and payment for equipment purchased under this specification shall be in accordance with the terms and conditions of the Invitation for Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

The crane shall be completely serviced and ready for operation when delivered.

VIII. ORDERING DATA (For Procurement Use Only)

Purchasers shall exercise any desired option offered herein and specify the following:

1. Title, number, and date of this specification.
2. If special instruments and gauges are required.
3. The quantity of operators, manuals, shop manuals, and parts books to be furnished.
4. If a third operating drum is not required.
5. If drum rotation indicators are required.
6. If on the job site training by a technician in the operation and maintenance of the crane is not required.
7. If a pilot model is not to be furnished.